

Office Action Summary	Application No.		Applicant(s)
	10/036,637		BIYIKLI, LEVENT
	Examiner		Art Unit
	Patrick J. Lee		2878

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 December 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-37 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17, 19-28 and 30-37 is/are rejected.
- 7) ☒ Claim(s) 18 and 29 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-17, 19-28, & 30-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miller 6,373,614 in view of Shieh 6,384,956.

With respect to claims 1-2 & 4-5, Miller discloses a polarization controller that comprises of a compensator as a continuously adjustable retarder comprising of retarders (33, 51, and 37') and beamsplitters (34, 36, and 38) and a limited-range adjustable retarder comprising of retarder stack (39). The compensator and retarder stack (39) are in optical communication with each other. The compensator is capable of transforming incident light to be linear polarized along a predetermined axis (see Miller column 3, lines 9-12). Servo control (see Miller column 14, lines 28-36) is used to adjust the polarity sensed from optical beamsplitters (34, 36, and 38).

However, the compensator composed of the retarder elements does have issues with resets when the retarder reaches an end of travel (see Miller column 16, lines 28-35). Shieh teaches a reset-free polarization controller comprising of quarter wave plates (100, 102, 104, and 106), which take incident light (110) and produce an output light (126) of desired polarization. Optical tap (126) diverts some of the output signal (112) into a sensor/controller (124), which then continuously sends the control signals to

Art Unit: 2878

an adjusting means (116, 118, 120, and 122) of the optical plates (100, 102, 104, 106) as stated in column 3, lines 45-57. Adjusting means can be a servo motor (see Shieh column 3, lines 41-44). To modify the teachings of Miller with those of Shieh would have been obvious because it would prevent resets, which can cause a significant loss in the tracking of the polarization (see Shieh column 4, lines 21-26).

With respect to claims 3 & 22, Shieh teaches the use of quarter wave plates. However, the use of half wave plates is known as Miller teaches a half wave plate (51) in his retarder arrangement. It would have been obvious to incorporate half wave plates, as they are capable of transforming displacements onto different axis (see Miller column 11, lines 60-64).

With respect to claims 6-7, 9, 13, & 24, Miller teaches that the retarders, including retarder stack (39) can be composed of liquid crystal polymers (see Miller column 6, lines 35-41). Retarders (138a and 138c) are substantially transparent windows as they allow light to pass through, while retarder (138c) is a liquid crystal medium disposed between the two substantially transparent windows.

With respect to claims 8 & 25, Miller does not explicitly state that retarder (138b) is connected to electrodes for application of a voltage, but such is known and would have been obvious because the application of a voltage would allow for control of a polarization state passed on by a retarder.

With respect to claims 10-12 & 26, neither Miller nor Shieh disclose the use of the nematic, ferroelectric, or the fluorinated ferroelectric liquid crystal material, but such

is known and would have been a mere matter of obvious design choice in order to get the desired retardation properties of the polarization wave plates.

With respect to claim 14, the arrangement of the liquid crystal cells to transform the polarization state in different directions is not explicitly taught, but such is known and would have been obvious in order to control the polarization effectively. This would allow for improved performance of the device and minimize the effect of dispersion.

With respect to claims 15 & 27, retarder stack (39) can comprise of liquid crystal retarders (138a and 138c) surrounding a quarter wave plate (138b). While Miller does not explicitly disclose a quarter wave plate for retarder (138b), such use is known and would have been obvious in order to control the polarization accurately.

With respect to claims 16 & 28, the use of a lithium niobate crystal, a lanthanum modified lead zirconate titanate (PLZT) material, and a mechanically stressed optical fiber is not explicitly disclosed, but such is known and would have been obvious in order to result in a desired polarization of the light.

With respect to claim 17, while the combination of teachings by Miller and Shieh teach that the limited range adjustable retarder is disposed after the continuously adjustable retarder, it would have been a mere matter of obvious design choice to dispose the limited range adjustable retarder before the continuously adjustable retarder as the device then would still be capable of adjusting the light for a desired polarization.

With respect to claim 19, Shieh teaches a controller (124) for the wave plates that are continuously adjustable. A controller for the limited range adjustable retarders

would have been obvious, as it would allow for increased control and would allow the device to reach a desired polarization quickly.

With respect to claims 20-21, 24 & 33-34, the teachings of Shieh combined with those of Miller disclose the polarization transformer (with a motor coupled to a wave plate) and controller as described above in the discussion of claims 1-2 & 4-5. While they do not disclose a delay system, such is known and would have been obvious in order to minimize the error due to polarization mode dispersion.

With respect to claim 30, the arrangement of the delay to receive two reoriented signals from the polarization transformer is known and would have been obvious in order to correct the dispersion.

With respect to claims 31-32, the use of optical fibers that maintain polarization and are either mechanically stressed or heated is known and would have been obvious in order to prevent further distortion of the polarization of the optical signal.

With respect to claim 35, Shieh does not explicitly disclose the use of an error signal circuit, but such is known and would have been obvious in order to send control signals that will correct the polarization accurately.

With respect to claims 36-37, the use of amplifiers and a lock-in amplifier is known and would have been obvious in order to improve the performance of the device in correcting for the polarization dispersion.

Allowable Subject Matter

3. Claims 18, & 29 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

4. The following is a statement of reasons for the indication of allowable subject matter:

With respect to claims 18 and 29, the prior art does not teach or suggest the difference in response times between the limited range and the continuously adjustable retarders.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Heismann 5,212,743 teaches an automatic polarization controller with reset-free operation.

Fishman et al 5,930,414 teach a system with a polarization controller and a delaying means.

Miller 6,421,131 teaches a birefringent interferometer.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patrick J. Lee whose telephone number is (703) 305-3871. The examiner can normally be reached on Monday through Friday, 8:00 am to 5:30 pm.

Art Unit: 2878


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David P. Porta can be reached on (703) 308-4852. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 746-9558 for regular communications and (703) 306-5511 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1782.

Patrick J. Lee
Examiner
Art Unit 2878

PJL

March 31, 2003


DAVID PORTA
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